

WHAT IS CLAIMED IS:

1. A die cushion apparatus of a press machine, wherein pressure oil is pressurized with a pressurizing force acting upon a die cushion pad, whereby sealed gas is compressed by pressure of the pressure oil thus pressurized.
2. A die cushion apparatus of a press machine, comprising:
 - a die cushion pad which is movable up and down according to a pressurizing force applied from outside;
 - a first pressure receiving unit comprising a first accommodation unit, a first sliding member and a first hydraulic chamber, the first sliding member and the first hydraulic chamber being accommodated in the first accommodation unit, wherein the first sliding member is caused to slide by a pressurizing force acting upon the die cushion pad to pressurize pressure oil in the first hydraulic chamber; and
 - a second pressure receiving unit comprising a second accommodation unit, a second sliding member, a second hydraulic chamber and a gas pressure chamber, the second hydraulic chamber and the gas pressure chamber being separated by the second sliding member, the second sliding member, the second hydraulic chamber and the gas pressure chamber being accommodated in the second accommodation unit, wherein the second sliding member is caused to slide by a pressure of the first hydraulic chamber to compress gas in the gas pressure chamber.
3. A die cushion apparatus of a press machine, comprising:
 - a die cushion pad which is movable up and down according to a pressurizing force applied from outside;
 - a first pressure receiving unit comprising a first accommodation unit, a first sliding member and a first hydraulic chamber, the first sliding member and the first hydraulic chamber being accommodated in the first accommodation unit, wherein the first sliding

member is caused to slide by a pressurizing force acting upon the die cushion pad to pressurize pressure oil in the first hydraulic chamber; and

a second pressure receiving unit comprising a second accommodation unit, a second sliding member, a second hydraulic chamber and a gas pressure chamber, the second hydraulic chamber and the gas pressure chamber being separated by the second sliding member, the second sliding member, the second hydraulic chamber and the gas pressure chamber being accommodated in the second accommodation unit, wherein the second sliding member is caused to slide by a pressure of the first hydraulic chamber to compress gas in the gas pressure chamber;

a first check valve that prevents a flow of the pressure oil from the first hydraulic chamber to a hydraulic pump;

a second check valve that prevents a flow of the pressure oil from the second hydraulic chamber to the first hydraulic chamber; and

an opening/closing unit that closes a flow of the pressure oil from the second hydraulic chamber to a hydraulic tank when the second sliding member slides in the direction of compressing the gas in the gas pressure chamber, and opens the flow of the pressure oil from the second hydraulic chamber to the hydraulic tank when the second sliding member slides in the direction of compressing the pressure oil in the second hydraulic chamber.

4. The die cushion apparatus according to claims 3, wherein opening degree of the opening/closing unit decreases according to sliding of the second sliding member in the direction of compressing the pressure oil in the second hydraulic chamber.

5. The die cushion apparatus according to claims 3, further comprising a first rod connected to the die cushion pad and a second rod connected to the first sliding member, wherein

when the die cushion pad is moved down, the first rod and the second rod are abutted and a pressurizing force acting upon the die cushion pad is applied to the first sliding member.

6. A method of reducing a surge pressure generated in a die cushion apparatus of a press machine, comprising:

a pressure oil pressurizing step of applying a pressurizing force to act upon a die cushion pad of the die cushion apparatus to pressure oil; and

a gas pressurizing step of applying a pressure of the pressure oil pressurized in the pressure oil pressurizing step to a gas.